9-5 Exercises

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GUIDED PRACTICE

1. **Vocabulary** Write two words related to the graph of a quadratic function that can be used to find the solution of the related *quadratic equation*.

SEE EXAMPLE 1 p. 642

Solve each equation by graphing the related function.

2. $x^2 - 4 = 0$
3. $x^2 = 16$
4. $-2x^2 - 6 = 0$
5. $-x^2 + 12x - 36 = 0$
6. $-x^2 = -9$
7. $2x^2 = 3x^2 - 2x - 8$
8. $x^2 - 6x + 9 = 0$
9. $8x = -4x^2 - 4$
10. $x^2 + 5x + 4 = 0$
11. $x^2 + 2 = 0$
12. $x^2 - 6x = 7$
13. $x^2 + 5x = -8$

SEE EXAMPLE 2 p. 644

14. **Sports** A baseball coach uses a pitching machine to simulate pop flies during practice. The quadratic function $y = -16x^2 + 80x$ models the height of the baseball after x seconds. How long is the baseball in the air?

PRACTICE AND PROBLEM SOLVING

Independent Practice

For Exercises	See Example
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Extra Practice
Skills Practice p. S21
Application Practice p. S36

Solve each equation by graphing the related function.

15. $-x^2 + 16 = 0$
16. $3x^2 = -7$
17. $5x^2 - 12x + 10 = x^2 + 10x$
18. $x^2 + 10x + 25 = 0$
19. $-4x^2 - 24x = 36$
20. $-9x^2 + 10x - 9 = -8x$
21. $-x^2 - 1 = 0$
22. $3x^2 - 27 = 0$
23. $4x^2 - 4x + 5 = 2x^2$

24. **Geography** Yosemite Falls in California is made of three smaller falls. The upper fall drops 1450 feet. The height h in feet of a water droplet falling from the upper fall to the next fall is modeled by $h(t) = -16t^2 + 1450$, where t is the time in seconds after the initial fall. Estimate the time it takes for the droplet to reach the next cascade.

Tell whether each statement is always, sometimes, or never true.

25. If the graph of a quadratic function has its vertex at the origin, then the related quadratic equation has exactly one solution.
26. If the graph of a quadratic function opens upward, then the related quadratic equation has two solutions.
27. If the graph of a quadratic function has its vertex on the x-axis, then the related quadratic equation has exactly one solution.
28. If the graph of a quadratic function has its vertex in the first quadrant, then the related quadratic equation has two solutions.
29. A quadratic equation in the form $ax^2 - c = 0$, where $a < 0$ and $c > 0$, has two solutions.

30. **Graphing Calculator** A fireworks shell is fired from a mortar. Its height is modeled by the function $h(t) = -16(t - 7)^2 + 784$, where t is the time in seconds and h is the height in feet.
    a. Graph the function.
    b. If the shell is supposed to explode at its maximum height, at what height should it explode?
    c. If the shell does not explode, how long will it take to return to the ground?